

REMARKS

Prior to entry of this amendment, claims 1-10 and 21-23 are currently pending in the subject application. Claims 22 and 23 have been withdrawn from consideration. Claim 1 is independent.

A. Introduction

In the outstanding Office Action Made Final, the Examiner objected to claim 10 as lacking antecedent basis for the term “atmospheric pressure”; rejected claim 1 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement; and rejected claims 1-10 and 21 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,144,340 to Hotomi et al. (“the Hotomi et al. reference”).

B. Objection to Claim 10

In the outstanding Office Action Made Final, the Examiner objected to claim 10 as lacking antecedent basis for the term “an atmospheric pressure.” Applicants respectfully disagree with the Examiner’s assertion. Nonetheless, in order to advance prosecution of the subject application, applicants have amended claim 10, as supported by ¶ 70 of the application. Accordingly, applicants respectfully request favorable reconsideration and withdrawal of the objection to claim 10.

C. Rejection of Claim 1 under 35 U.S.C. § 112, First Paragraph

In the outstanding Office Action Made Final, the Examiner rejected claim 1 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse this rejection for at least the reasons set forth below.

Claim 1 was amended by the amendment filed July 12, 2006. In the July 12th amendment, applicants indicated that support for claim 1 could be found in ¶¶ [0060]-[0062] of

the specification. In the outstanding Office action, the Examiner asserted that he was not sure as to the metes and bounds of parts (b) and (c) of claim 1 based on ¶ [0061] of the specification, since it is unclear whether “the electric field change the chemical composition of the hydrophobic layer (element 130) or does the electric field create a force to overcome the surface tension of the ink inside the nozzle in order to eject a drop from an outlet?” *See the Office action of October 20, 2006, page 3.* Applicants respectfully disagree and submit that the specification of the application as filed clearly support the language of claim 1.

Paragraph [0061] of the specification is reproduced below,

[0061] Next, as shown in FIG. 10B, when a voltage is sequentially applied from a first power source 170 to a first electrode pad 151 and a second electrode pad 152, ink 101 moves a portion of the nozzle 110 corresponding to a location of the second electrode pad 152. The movement of ink 101 occurs when a voltage is applied to the first and second electrode pads 151 and 152. This application of voltage causes the surface property of the hydrophobic layer 130 at a location corresponding to the first and second electrode pads 151 and 152 to change to a hydrophilic property. More specifically, when the voltage is applied to the first and second electrode pads 151 and 152, the surface tension of ink 101 is reduced by an electric field acting on ink 101. As such, a contact angle of ink 101 with respect to the hydrophobic layer 130 is reduced. Thus, ink 101 moves by a capillary force to the portion of the nozzle 110 corresponding to the position of the second electrode pad 152.

In particular, applicants respectfully submit that the disclosure in paragraph [0061] that “when the voltage is applied ... the surface tension of ink is reduced by an electric field acting on ink 101... [and] a contact angle of ink 101 with respect to the hydrophobic layer 130 is reduced” in light of the language in paragraph [0057], explaining the behavior of ink and its surface tension subject to an electric field force, clearly supports the language of claim 1.

Additionally, applicants submit that, at the very least, persons of ordinary skill in the art at the time of the invention would clearly interpret the “forming an electric field... [and]

modifying a magnitude and location of the electric field to vary a surface tension of ink”

language of claim 1 as formation of a force to overcome a surface tension of the ink and not as modification of a chemical composition thereof.

Accordingly, applicants respectfully submit that the subject matter of claim 1 was clearly described in the specification at the time the application was filed. Therefore, applicants respectfully request that this rejection be favorably reconsidered and withdrawn.

D. Asserted Anticipation Rejection of Independent Claims 1-10 and 21

In the outstanding Office Action Made Final, the Examiner rejected claims 1-10 and 21 under 35 U.S.C. § 102(b) as being anticipated by the Hotomi et al. reference. Applicants respectfully traverse this rejection, and respectfully submit that the Examiner has failed to set forth a *prima facie* case of anticipation for at least the reasons set forth below.

Claim 1 recites (emphasis added),

A method of ejecting ink comprising:

(a) filling a rear end of a nozzle with ink using a capillary force, the rear end of the nozzle being surrounded by a hydrophilic layer;

(b) forming an electric field directed toward an outlet of the nozzle on a front end of the nozzle, the front end of the nozzle being surrounded by a hydrophobic layer;

(c) *modifying a magnitude and location of the electric field to vary a surface tension of ink to separate ink droplets having a predetermined volume from ink and to move the separated ink droplets within the front end of the nozzle toward the outlet of the nozzle; and*

(d) ejecting the separated ink droplets through the outlet of the nozzle.

The present invention clearly refers in step (c) of claim 1 to a printer nozzle, where a change in the magnitude and location of the electric field can separate ink into ink droplets inside the nozzle and provide movement thereof. In other words, localized electrostatic control of

specific separate electric field segments in the front end of the nozzle may separate a continuous ink volume into discrete droplets that can move independently *inside* the nozzle. *Application as filed, FIGS. 4 and 10A-10E and corresponding text.* The Hotomi et al. reference, on the other hand, does not teach, or even remotely suggest, such formation of ink droplets.

Even though the Hotomi et al. reference teaches application of alternating voltage to different electrodes in order to form a non-uniform electric field within a printer nozzle, there is no teaching whatsoever of specific localized electrostatic control for the purpose of *forming and moving ink droplets inside the nozzle*. The mere disclosure of application of an alternating voltage to electrodes does not amount to disclosing or teaching formation and control of ink droplets inside the printer nozzle. In fact, the Hotomi et al. reference teaches formation and ejection of ink droplets by application of an *additional independent power source*, as opposed to modifying the existing electric field created by the alternating voltage. *Hotomi et al., col. 16-17, lines 51-9.*

In view of the above, applicants respectfully submit that the Hotomi et al. reference fails to disclose, or even suggest, each and every element of claim 1, and therefore, claim 1 is believed allowable over the cited prior art. Therefore, applicants further request allowance of claims 2-10 and 21 as dependent from allowable independent claim 1. Accordingly, applicants respectfully request that the rejection of claim 1 and its dependent claims be favorably reconsidered and withdrawn.

E. Conclusion

The remaining documents cited by the Examiner were not relied on to reject the claims. Therefore, no comments concerning these documents are considered necessary at this time.

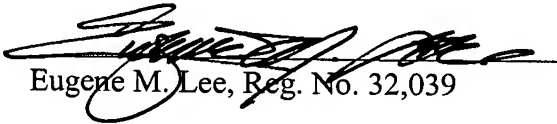
If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing amendments and remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all the claims is hereby requested.

Respectfully submitted,

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PETITION and
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This document and any concurrently filed papers are believed to be timely. Should any extension of the term be required, applicant hereby petitions the Director for such extension and requests that any applicable petition fee be charged to Deposit Account No. 50-1645.

If fee payment is enclosed, this amount is believed to be correct. However, the Director is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1645.

Any additional fee(s) necessary to effect the proper and timely filing of the accompanying-papers may also be charged to Deposit Account No. 50-1645.